BOOK 1

ISBN : 978-602-8915-93-9

ISNAR-C2FS 2011

International Seminar on Natural Resources, Climate Change and Food Security in Developing Countries

Proceeding

Sub Theme : Adaptation and Production
ISBN : 978-602-8915-93-9

CHARACTERISTIC OF GROWTH AND PRODUCTION OF OYSTER MUSHROOMS AT MEDIUM LAND LITTER MEDIA

Widiwurjani and Guniarti

Faculty of Agriculture, University of Pembangunan Nasional "Veteran" East Java
Surabaya – Indonesia

ABSTRACT

This study used quantitative identification by analysis data observation growth parameter. The research was designed in Randomized Completely Design Results of the research showed there are significanty interaction between varieties and percentage use of subtitution material. Growth media able to give good result are media from substitution raw material 25% of Litter Leucaena, tithonia, Straw and litter of yard . Substitution raw material Leucaena and tithonia 50% able to support growth and muhromoyster production harvest at beginning period. Media which ability to growth and production equal with control media are media from 25% substitution Litter Leucaena, tithonia, straw and litter of yard until treatment S1P3, S2P3, S3P3 and S4P3 able recommendation as the solution if raw material sawdust as main media mushrom growth are limited. Characteristic mushrom growth to show varieties pattern. Mushrom which growth on straw media and litter of yard tend to show characteristic growth same with control, but mushrom which growth on Leucaena media and tithonia tend to show characteristic growth different with control. Period of mushrom growth on Leucaena media and tithonia are 50-75% tend to short compared mushrom growth on subtitution media 25%, until get total production value and BER also different. Total production value and BER nearest the control get on subtitution media Litter Leucaena, tithonia, straw and litter of yard 25%, than follow by substitution media from Litter Leucaena and tithonia 50%.

INTRODUCTION

Oyster mushrooms able to cropping into artificial media that is Log, is artificial media which created by wood and catered by plastic and already sterilization for place of growth mushrom. Oyster mushrooms is agricultural product have bussiness value for the farmer. Oyster mushrooms usually cropping an high valley, but for fullfil raw material need to research about use of Litter as the subtitution material for basic material media.

Research of Litter from Leucaena (S1), Tithonia (S2), Dry straw (S3) dan Litter of yard (S4), through compossed processing. Percentage use of Litter for media growth mushrom regulated as follows : 75%, 50% and 25%. Growth media (baglog) origin from Litter, tithonia, Leucaena, Straw being and litter of yard through compossed processing need to examination as media growth Oyster mushrooms.

Growth media is growth media which ability equal with baglog ability from sawdust. Purpose the research is getting subtitution material for growth mushroom media from Litter. Until get the salution for the farmer have constrain get raw material sawdust and use the Litter to support agribusiness Oyster mushrooms on medium valley and heterogenisation substitution material (non sawdust) as favourable media for growth and production of Oyster mushrooms.

MATERIALS AND METHOD

Aplication the research on April until October 2010. The research excute at Mojokerto, East Java, for growth data analysis and production at laboratorium, Agriculture Faculty, UPN "Veteran" East Java. Planning to use Random planning factorial which 12 treatment and three times replication

Factor I is subtitution by 4 level.

Factor II is pracutation substitution material by 3 level.

As control use sawdust media as main material.

Factor I (subtitution material sawdust) with 4 level, follows Leucaena, tithonia, Dry Straw and Litter.

Factor II (percentation subtitute material) with 3 level; 75%, 50% and 25% subtitution material.

This research use methode Quantitative identification by analysis of observation data parameter of growth. Use random analysis by examination. Farily different and Dunnot examination, and to analysis polynomial regression to show the pattern characteristic of growth and production of jamur on heterogen nouth media. Observation parameter included growth characteristic about identification and growth analysis :

1. Periodic misselium, appear misselium until perfected growth misselium 100%.
2. growth misselium until appear of fruit body (clearly incubation)
3. growth of form fruit body untul harvest

for observation characteristis of production included :

1. amount of fruit body
2. diameter body while at harvest
3. weight of fruit body at harvest
4. total of massa at harvest
5. BER (Biology Efficiency Ratio)

RESULTS AND DISCUSSION

Table 1. Percentage Average of Misselium Growth at Variety Treatment and Observation

Treatment	Percentage Average of Misselium Growth					
	Week	Week II	Week III	Week IV	Week V	Week VI
S1P1	5,00	19,00	50,00	81,67	96,33	100,00
S2P1	5,00	20,00	50,00	83,00	95,67	100,00
S3P1	5,50	19,50	49,33	83,67	95,00	100,00
S4P1	5,67	20,33	49,33	81,33	94,00	100,00
S1P2	5,50	21,00	51,67	83,33	93,67	100,00
S2P2	5,00	20,00	53,33	82,33	95,00	100,00
S3P2	5,67	20,67	50,00	82,33	93,67	100,00
S4P2	5,50	20,33	51,67	82,00	93,67	100,00
S1P3	5,50	20,67	51,00	81,67	94,67	100,00
S2P3	5,83	20,00	52,33	82,00	94,00	100,00
S3P3	5,67	20,33	50,67	81,33	93,67	100,00
S4P3	5,83	20,00	51,67	82,00	93,67	100,00
HSD	Ns	Ns	ns	ns	Ns	ns

Notes : ns = non significant

Table 2. Time Average for Appear of Fruit Body at Variety Treatment and Variety Harvest

Treatment	Time Average for Appear of Fruit Body												
	Harvest I		Harvest II		Harvest III		Harvest IV		Harvest V		Harvest VI		Average
S1P1	4,33	a	4,00	a	4,00	A	6,00	b	6,33	b	6,67	b	5,22
S2P1	4,33	a	4,33	ab	4,00	A	6,00	b	6,33	b	6,33	b	5,22
S3P1	6,67	c	6,33	c	6,33	B	4,00	a	3,67	a	2,33	a	4,89
S4P1	6,67	c	6,33	c	6,67	B	5,00	ab	3,33	a	2,67	a	5,11
S1P2	5,00	ab	4,33	ab	4,00	A	6,00	ab	6,33	b	6,00	b	5,28
S2P2	4,33	a	4,33	ab	4,00	A	6,33	b	6,00	b	6,33	b	5,22
S3P2	7,00	c	6,67	c	8,67	B	4,33	a	3,33	a	2,67	a	5,11
S4P2	6,00	bc	7,00	c	6,67	B	4,33	a	3,67	a	2,33	a	5,00
S1P3	6,67	c	6,33	c	6,67	B	4,67	ab	4,00	a	2,67	a	5,17
S2P3	6,00	ab	5,67	bc	8,00	B	4,33	a	4,33	ab	2,67	a	4,83
S3P3	6,67	c	5,67	bc	8,00	B	4,33	a	3,67	a	3,00	a	4,89
S4P3	6,67	c	5,33	abc	6,00	B	4,33	a	3,67	a	2,33	a	4,72
HSD	1,55		1,55		1,10		1,55		1,77		2,30		

Table 3. Time Average for Growth of Fruit Body at Harvest at Variety Treatment and Variety Harvest

Treatment	Time Average for Growth of Fruit Body (day)												
	Harvest I		Harvest II		Harvest III		Harvest IV		Harvest V		Harvest VI		Average
S1P1	1,67	ab	2,33	a	2,3	a	3,67	c	2,67	abc	4,87	be	2,89
S2P1	1,33	a	2,67	a	2,3	a	3,33	be	3,00	be	5,00	c	2,94
S3P1	2,67	ab	4,00	a	4,0	a	1,67	a	1,00	a	2,00	a	2,56
S4P1	3,33	ab	4,00	a	4,0	a	2,00	ab	1,33	ab	2,33	a	2,83
S1P2	1,67	ab	2,33	a	2,6	a	3,33	be	3,33	c	4,67	be	3,00
S2P2	1,33	a	2,33	a	2,6	a	4,00	c	3,33	c	5,00	c	3,11
S3P2	3,33	ab	4,33	a	4,3	a	1,67	a	1,33	ab	2,33	a	2,89
S4P2	3,00	ab	4,00	a	4,00	a	2,00	a	1,33	ab	2,33	a	2,78
S1P3	3,00	ab	3,67	a	3,6	a	1,33	a	1,67	abc	2,67	ab	2,67
S2P3	3,67	b	3,33	a	3,3	a	2,00	a	1,00	a	2,67	ab	2,67
S3P3	1,67	ab	2,67	a	2,6	A	1,33	a	1,33	ab	2,67	ab	2,06
S4P3	2,00	ab	2,67	a	2,6	A	1,33	a	1,00	a	2,67	ab	2,06
HSD	2,25		2,25		2,2		1,63		1,84		2,25		2,08

Table 4. Weight of Fruit Body Average at Variety Treatment and Variety Harvest

Treatment	Weight of Fruit Body Average at Variety Treatment and Variety Harvest												Average
	Harvest I		Harvest II		Harvest III		Harvest IV		Harvest V		Harvest VI		
SIP1	92,00	bc	89,33	b	83,00	A	89,33	b	80,00	ab	79,33		85,50
S2P1	88,33	bc	85,00	ab	82,87	C	85,00	ab	80,00	ab	79,33		83,39
S3P1	67,33	a	69,67	a	71,33	Ab	89,67	a	86,33	ab	83,00		74,56
S4P1	65,67	a	88,33	a	70,00	A	88,33	a	87,33	ab	86,33		74,33
S1P2	88,33	bc	88,33	b	83,00	C	88,33	b	79,00	a	80,33		$4,56
S2P2	90,33	bc	88,33	b	83,67	C	88,33	b	80,00	ab	80,00		85,11
S3P2	71,00	a	70,33	ab	72,00	Ab	70,33	ab	88,67	b	83,33		75,94
S4P2	66,67	a	70,33	ab	70,00	A	70,33	ab	86,00	ab	85,33		74,78
S1P3	88,33	b	88,33	b	81,00	Bc	88,33	b	83,33	ab	81,00		85,06
S2P3	85,00	ab	83,67	ab	82,67	C	83,67	ab	82,67	ab	82,67		83,39
S3P3	90,33	bc	87,67	a	82,33	C	87,67	b	82,33	ab	82,33		85,44
S4P3	90,00	bc	84,00	ab	81,67	Bc	84,00	ab	82,33	ab	81,67		83,94
HSD	15,17		17,22		10,27		17,22		8,64		TN		

Result of research to show any real interaction between kind of aid percentage subtitution material. Subtitution material Leucanea and tithonia about 50% - 75% give growth and good production at beginning period harvest (period harvest 1-23) and for further harvest period (period harvest 4-6), treatment Litter Straw and Litter of yard give the good result at 75%, 50% and 25%. The matter above can

explainated that Leucanea and tithonia easy to leave nutrient until nutrient ready at beginning growth compared other media, such Straw and litter of yard.

Content nutrient enough capacity able to accelerate of growth and harvest mode body fruit. Furtherware can explainated by Widiwurjani and Guniarti (2010) that content C/N Ratio by central media have high value compared substitute media. High value C/N ratio show that material still raw and not yet decomposition untul not yet ready as supplier nutrient

Subtitute media that fertilized have C/N low value until medium. Low value will be effect the nutrition became decrease, due to good ration value C/N around medium such 10-20, until the media ready to supply of food but not to fast and ready at misselium not yet to need and when misselium need to growth, the condition tend to empty.

Result of reseach any organic manure Litter media when compared the control to give recommination result due to have ability which not real different with growth and production of mushrom growth at media control. Result of growth observation and production of mushrom at variety of period harvest already tabulated as the below table : input checklist table..

Table 5. Recapitulation Growth Ability and Each Treatment Production Compared Control (wood particle)

Treatment	Miselium	Pupil body fruit	Growth body fruit	Amount of fruit body	Diameter body while at harvest	Total of massa at harvest	Total production at 6 times harvest
S1P1	V	V	V	X	X	V	X
S2P1	V	V	V	X	X	V	X
S3P1	V	V	V	X	X	X	X
S4P1	V	V	V	X	X	X	X
S1P2	V	V	V	X	X	V	X
S2P2	V	V	V	X	X	V	X
S3P2	V	V	V	X	X	X	X
S4P2	V	V	V	X	X	X	X
S1P3	V	V	V	X	V	X	V
S2P3	V	V	V	X	V	X	V
S3P3	V	V	V	V	V	X	V
S4P3	V	V	V	V	V	X	V

The table shows that the treatment recomendated to mushrom growth media by same ability with control media are orign media from Leucanea Litter, tithonia,

Sub Theme : Adaptation and Production
ISBN : 978-602-8915-93-9

Straw and Litter of yard around 25%. Use raw subtitution around 25% posibble for support the growth and production mushroom same with wood media.

This activity due to four media which examination also have nitrogen content, phospor and kalium for misselium growth and body fruit also in Litter which examination as raw substitution untuk the growth media created from organic manure Litter material have function as baglog from the woood. This activity same by the research Widiwurjani and Guniarti (2009) already have evidance that result laboratorium analysis about content of nutrition in four organic manure from Litter Leucanea, tithonia, Straw and litter of yard. This is same with Wahyudi, Husen and Santoso (2002), the nutrition which need for growth misselium and develop body fruit such legnin, selulose, hemiselulose and protein Which after decomposition will be nutrition result which for mushrom need.

Growth of misselium and body fruit at each treatment are different. Any equalization by control, such media from tithonia, average of misselium up to perfect growth (90 – 100%) at 5-6 weeks after inoculation and growth as body fruit of mushroom average at 6-8 weeks after inoculation. In generally growth ofoyster mushroom at highland more fast than result from this research. This activity due to of micro season different, specialy about humidity and temperature. At micro season 20-25°C and humidity 90-95% and able difference by stabil will be get perfect misselium growth at 3-4 weeks and body fruit ready for harvest at 6-7 weeks (Anonymous 2005). By the way that Litter material able to examinated as subtitution serbuk gergaji to product whiteoyster plan media (bag log) for support white oyster agribussiness at medium land for not defend of sawdust and get verieties of basic material for product oyster mushrooms plan media.

Pattern of growth characteristic and mushroom production at any media have any varieties pattern. Treatment which to show pattern characteristic of growth equal with characteristic of mushrom growth at control media have meaning that material from substitution have same condition and characteristic with control media, until able to give pattern of growth and production became same. In generally that four Litter meddia which examinated, media from Litter Straw and litter of yard have same pattern with pattern of growth and production of mushroom at control media on growth period.

Table 6. Total Avegare Harvest, Total Production, Biology Efficiency Ratio (BER) at Different Treatment

Treatment	Harvest (day)	Production (gr)	BER / log
KONTROL	69,40	842,67	10,86
S1P1	49,72	513,00	10,32
S2P1	49,67	500,33	10,07
S3P1	49,06	447,33	9,12
S4P1	49,61	446,00	8,99
S1P2	59,96	547,33	9,13
S2P2	61,51	580,99	9,45
S3P2	72,13	523,12	7,25
S4P2	72,44	516,22	7,13
S 1P3	69,44	755,43	10,88
S2P3	69,64	761,77	10,94
S3P3	72,52	841,99	11,61
S4P3	72,68	838,35	11,53

Media from Litter Leucanea and tithonia tend to show pattern of growth and production be opposite. This activity due to Litter Leucanea and Litter tithonia have soft texture, furthermore easy to degradation and to give unsur hara which need by mushrom misselium. This condition due to pattern of growth and mushrom production at Leucanea and tithonia media more better at beginning period and decrease at west period.

CONCLUSION

Basically the research, four Litter material which examinated as substitution media for white mushrooms growth at medium land have result as follow :

1. Any real interaction between variety and percentage usage substitutin material. Growth media give good result are media from substitution material 25% from Litter Leucanea, tithonia, Straw and litter of yard. Material subtitution Leucanea and tithonia 50% able to support growth and production of mushroom at beginning harvest.
2. Media which have able to growth and production equal with control media are media from 25% material subtitution Litter Leucanea, tithonia, Straw and Litter of yard until treatment of S1P3, S2P3, S3P3 and S4P3 recomendated as the solution. If any raw material timber constraint as main material for mushrom growth.

3. Characteristic pattern of mushrom growth to show varieties pattern. Mushrom growth at Straw and Litter of yardmedia tend to show pattern of growth same with control media, but mushrom that growth at Leucanea and tithonia media tend to show pattern of growth different with control media.
4. mushrom growth period which growth at Leucanea media and tithonia around 50-75% tend to short than mushrom growth which growth at substitution media 25% until get total production value and BER are different. Total production value and BER nearest control get at subtitution media Litter Leucanea, tithonia, Straw and Litter of yardas 25% than follow by subtitution media Litter Leucanea and tithonia as 50%.

REFERENCES

Adiyuwono. 2002. Pengomposan media Champignon. Trubus 388 XXXIII: 48 Amni, L, 2005. Tiram Gantung Produksi Melambung, Majalah Trubus, 429: 104 -105

Anonymous. 2005. Pertumbuhan dan perkembangan jamur tiram. http:/bima.ipb.ac.id/ -tpb-ipb/materi/bio 100/materi/Cendawan.html. 3 halaman

Cahyana, YA., Muchrodji, 2006. Budidaya Jamur Kuping Penerbit Penebar Swadaya, Jakarta 64 hal.

Guniarti dan Widiwurjani. 2007. Kajian Bahan Subtitusi (sekam dan sabut kelapa) dan Lama Pengomposan pada media Tanam terhadap Pertumbuhan dan Produksi Jamur Tiram. Laporan Penelitian yang Didanai UPN dan Belum dipublikasikan.

Henky Isnawan, Netty Widyastuti, Donowati, 2003. Teknologi Bioproses Pembibitan dan Produksi Jamur Tiram untuk Peningkatan Nilai Tambah Pertanian, Prosiding Seminar Teknologi untuk Negeri Vol II (123-126).

Lili Muskhat, 2005. Pengelolaan Sampah dengan Cara Menjadikan Kompos, Jurnal Kesehatan Lingkungan Vol 2 No 1 Juli 2005 (77- 84).

Moerdiati, Widaryanto, dan Budi. 2003. Pengaruh Lama Pengomposan dan Pemotongan Panjang Jerami terhadap Pertumbuhan dan Hasil Jamur Tiram. Habitat vol XI V No 3 : 162-167.

Parlindungan AK, 2004. Karakteristik Pertumbuhan dan Produksi Jamur Tiram Putih dan Jamur Tiram Kelabu pada Baglog Alang-Alang Jurnal Natur Indonesia 5 (2) (152 - 156)

Suripin, 2004. Pelestarian Sumber Daya Tanah dan Air Penerbit Andi Yogyakarta 209 hal

Suriawiria, U., 2002. Budidaya Jamur Tiram, Penerbit Kanisius, Yogjakarta,86 hal.

Sri Sumarsih, 2007. Budidaya Jamur Tiram dengan Berbagai Media, http//Sumarsiho7. Files Wordpress.Com/2008/11/brosur-penanaman jamurZ.pdf.

Sumanni, 2006. Botani & Tinjauan Gizi Jamur Tiram Putih Jurnal Inovasi Pertanian Vol 4, No 2, 2006 (124-130)

Ruskandi. 2006. Teknik Pembuatan Kompos Limbah Kebun Pertanaman Kelapa Polikultur. Buletin Teknik Pertanian Vol 11 No 1 : http/www.pustakareptan.go.id/pulication/bt111068.pdf

Rachman Sutanto. 2002. Pertanian Organik Menuju Pertanian Alternatif dan Berkelanjutan. Kansius, Jogyakarta.

Wahyudi, Husen dan Santoso. 2002. Pengaruh Macam Serbuk Gergaji Terhadap Produksi dan Kandungan Nutrisi Tiga jenis Jamur Kayu. Jurnal Tropika vol 10. no 1 :79-86

Widiwurjani dari Guniarti. 2010. Four Kids Of Materials Litter Potentials As Substitution Material For Media Grows Of White Oyster Mushroom (Pleurotus ostreatus). Proceeding International Seminar On Horticulture to Support Food Security 2010. Bandar Lampung, Indonesia.

Widiwurjani dan Ida Retno. 2007. Pengaruh Penambahan Nutrisi dan Lubang Tumbuh terhadap Pertumbuhan dan Produksi Jamur Tiram. Penelitian mandiri yang belum dipublikasikan.

Wigati Istuti dan Siti Nurbana, 2006. Budidaya Jamur Tiram Info Teknologi Pertanian No 88 tahun 2006 (2-6)